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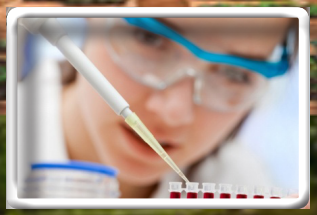


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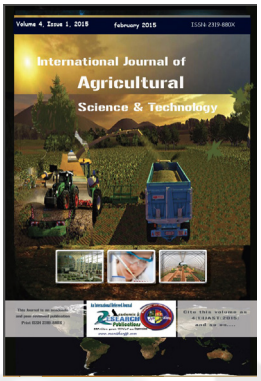
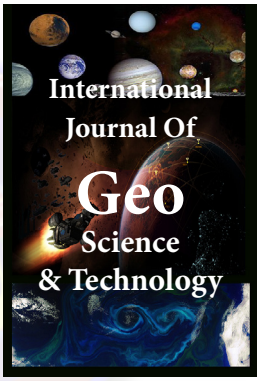
Contents





Int. J. Agri.Sci. & Tech. Vol. 4 (1) 2015, pp. 1-4

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CHARACTERISTIC OF FOG, FOGGY WEATHER AND ITS IMPACT ON AGRICULTURE

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Abstract

This work is on the basis of different literature survey which is base on the real time observation are observed at during the foggy weather condition at Research Farm, Department of Agricultural Meteorology, CCS HAU, Hisar during the winter season of subsequent year on rabi crop, several significant impact to promoting the fungal diseases if prolonged days of foggy weather also minimized the dispersion rate of beneficial insect over the crop and their ideal time of pollination by beneficial insect will also change, Insecticide and liquid fertilizer over the crop field are not recommending spraying during dense or thicker fog condition, adversely affect due to reduced solar radiation as PAR which is influencing for photosynthesis and reduces the evapotranspiration and photosynthesis rate of different field crop.

Key words: Fog, Mist, Foggy Weather, Impact on Rabi Crop, Pest Dispersion.

Pages :04 **References: 07**

INTRODUCTION

Brief About Fog

The particular weather condition would occur in formation of fog in the environment and lot of moisture level, average relative humidity level was higher. The regular phenomena in the environment during the winter seasons (India's most of the part is covered by fog during the winter season) in regions like North West, North East and Central India but few days with less thicker fog observed in the Western Part of India also. Fog consist small tiny suspended droplets of water molecules, which may be settling out and evaporating, which restrict the clear horizontal visibility and persist for some period of time during early morning and night time, generally sun rise with high intensity insolation started its quickly dissipated. Fog is generally a collection of liquid water

droplets suspended in air at or near the Earth's surface, Fog can be considered a type of low-lying cloud, and is heavily influenced by nearby bodies of water, topography, wind conditions, and even human activities. In turn, fog has affected many human activities, such as shipping and transport, warfare, and culture. Fog can contribute significantly to crop water needs and can be measured by covering the funnel of a rain gauge with a set of fine wires. Quantitative data on fog precipitation may not be available. However, nomograms for predicting occurrence of fog at airports are available with forecasters and the same can be adopted for use in agricultural weather forecasts. The requirement of meteorological conditions for fog formation are the same as for dew those formation except for the need for absence of air-turbulence or current (vertical movement of air) in the air layers close to the ground and crop-canopy temperature being lower than the screen temperatures. Fog season is generally considered from November to February, with the months of December and January witnessing the longest durations of dense fog in North-west plains of India Singh and Singh 2010; Verma, 1989; Samui and Gupta 1994).

Depth of Fog

Fog may vary in depth occurring within the lowest meter of the atmosphere and extending up to 1000m in height. Occasionally the fog layer may be somewhat elevated above the surface, particularly during the fog dispersion, breakup process. For condensation, the relative humilities of the air do not necessarily need to be 100% and in fact may be as low as 80–90% both during and after formation. These conditions are mostly associated with a temperature dew point spread of approximately 3 ^{0}C and a stable layer of atmosphere.

Fog or Foggy Weather

During the foggy weather conditions the early morning have same mercury reading in Dry bulb temperature and wet bulb temperature, there is less possibility to mix the more amount of water vapour in the surrounding atmospheric air and relative humidity value becomes 100 percent. It creates the situation of different parameters value become equal like saturated vapour pressure (SVP), actual vapour pressure (AVP), dew point temperature, dry bulb and wet bulb temperature during early morning (at 0730 hrs) and then dissipated with start the insolation reaching on the earth surface.

MATERIALS AND METHODS

This work is on the basis of different literature survey and real time observation which were observed at real time during the foggy weather condition at Research Farm, Department of Agricultural Meteorology, CCS HAU, Hisar during the winter season of subsequence year on rabi crop. Different types of observation also monitoring for the pest dispersion and its dynamic during the period of Fog/mist or foggy weather condition.

Observation of Fog

Now-a-days various methods of taken observation and the basis of their uses in the site specific like agrometeorological ob-

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server, breeder, insect ecologist, entomologist and plant pathologist for their own research purpose. Various methods and instrumentation used to determine visibility are presented in the visibility portion, but most of the site there is necked eyes observation on the visibility basis, visibility will be decided by human being eye observation in most of the agrometeorological observatory and then interpreted by the meteorological observer on the basis of their visibility from the standing point to clear distinct vision.

Types of observation

The most obvious types of observations of fog are its occurrence, reduction of visibility and fog's thickness or intensity, color (of limited use in reporting), duration, and extent. The traditional method of observation is on the basis of human eye observation, how far one can clearly see. The two basic processes responsible for formation, as well as duration, are radiation and advection which includes vertical mixing of air). It is based upon these observations that fog is often referred to as 'a cloud on the ground' and which consists of visible hydrometeors.

RESULTS AND DISCUSSION

The several significant advantages of fog/mist or foggy weather over the Agriculture during the winter season in north west, north east part of country. The surface grass hopper activity will minimized in the wheat crop field, Minimum termite infestation in cultivate field crop (i.e. wheat), the average higher humidity level prevailed during foggy weather to prevent the frosting condition somehow in Mustard vegetable crops and small horticultural crop, Dispersion rate of insect and pest over crop will minimized. During the dense fog weather condition there will be chance to receive only diffuse or sky radiation. The minimum temperature was value observed over the normal and significant fall in the day maximum temperature could be occurs at the place there dense fog or mist weather was occurred during winter season. Dis-advantage of fog or foggy weather over the Agriculture, Due to high humidity level in foggy weather condition, possibility to occurrence of white rust and alternaria blight in the mustard crop. Pest and fungal diseases infestation would be maximized mist/foggy weather condition, increase the population of sucking pest due to higher humidity level which damage the tender part of crop. Pollination would be minimized due to higher, humidity level in self or cross pollination field crop, vegetable etc or Impact vegetables and fruits adversely if foggy and overcast conditions continue. and reduced the evapotranspiration and photosynthesis rate of different crops. Promote skin disease/infection of Animal/cattle. To minimized assimilation rate or CHO group accumulation or carbohydrate over crop or plant due to less PAR insolation/absorption. Dense fog and mist continue to occur for some more days then it can cause diseases like late blight on potato crop. The movement of pollinator or beneficial insect will also minimized due to high relative humidity present in the environment or surrounding lower atmospheric boundary layer. Using the weedicide, fungicide, Insecticide and liquid fertilizer over the crop field are not recommending spraying during dense or thicker fog condition due to leaf wetness duration will be increase to permit the fungal disease.

ISSN: 2319-880X

CONCLUSION

The foggy weather is somehow advantageous to the agriculture crop as it meet the some requirement of irrigation, weedicide, fungicide, Insecticide and liquid fertilizer over the crop field are not recommended to spraying during dense or thicker fog condition due to the prolong wetting time of crop leaves, reduces the dispersion rate of different insect pest and promote the fungal diseases of crop, adversely affected due to reduced the solar radiation as PAR which is influencing for photosynthesis and reduces the evapotranspiration and photosynthesis rate of different field crop, the infestation of insect will also become lower along with dispersion over the crop canopy.

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Int. J. Agri.Sci. & Tech. Vol. 4 (1) 2015, pp. 5-15

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ECONOMICAL ANALYSIS OF POTATO PRODUCTION: NATURE AND EXTENT OF MARKETABLE & MARKETED SURPLUS

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Abstract

The present study was conducted in Jaunpur district of Uttar Pradesh using the Multi-Stage Research Design.Total 100 respondents (44 marginal, 26 small, 18 medium and 12 large) were selected based on proportional random sampling method. The data were collected using structured interview schedule. The data collected were then analyzed using appropriate statistical tools namely, frequency, percentage, mean, and standard deviation. It may be concluded that overall, cost of cultivation per hectare was observed Rs. 31873.42 the major share of cost was 41.32 per cent of seed followed by 22.75 per cent family labour, 8.20 per cent manure and fertilizer respectively.On an average gross return, net return, family labour income, farm investment income and farm business income Rs. 98965.25, Rs. 60424.02, Rs. 67676.25 and Rs. 44859.12 respectively. Overall cost of production per quintal on the basis of cost C1 and C was found Rs. 157.91 and Rs. 175.45 respectively. On an overall average, input-output ratio was found 2.67 per cent.Overall average of marketable surplus came to 37.95 quintal i.e. 82.53 per cent of the total production and overall average of marketed surplus was recorded to 36.56 quintal per farm i.e. 79.51 per cent of the total production.

Key Words: Potato Production, Cost, Marketing and Measures.

Pages: 11 **References: 25**

INTRODUCTION

The original home of Potato is the Andean Plateau of South America. It was introduced into Europe in the second

half of the 16th Century but gained recognition as an inexpensive and a nutritive food only during the 18th Century. Potato is the most abundantly produced edible food in the world next to cereal. Potato is a wholesome food. Apart from starch of which it is a rich source, it provides essential body-building substances such as starch, vitamins, minerals and protein. Potato is one of the richest sources of calories needed to maintain day-to-day output of human energy. Seventy five per cent of the total Indian population depends on agriculture. The potato crop is particularly suited to Indian conditions. Besides ecological and agronomic factors, economic and social consideration also favors a rapid expansion for its cultivation. Potato enjoys a wide range of seasonal adaptability. The Gangetic plains of Uttar Pradesh contributes annually about 35 per cent of the total area under potato cultivation in the country. Here, the sowing time of the crop can be extended over a period of three months, from October to the end of December, an advantage which perhaps no other crop enjoys. In Southern India, where summer temperatures in the plateau region are somewhat milder, two crops, one in winter and the other in summer, can be raised. It should be recognized that very few crops can be raised successfully both in the rabi and the kharif seasons in the same track. In the Nilgiri Hills, three potato crops are raised almost in succession, the planting month's beings April, August, and January (Anonymous 2008).

Wide flexibility in planting time of a semi-perishable commodity like potato is of great significance, since it makes efficient planning and adjustments in cropping sequence possible. Almost all crops grow, in one season or the other, in the plains of the country but only a few of them, of which potato is the chief one, grow successfully at high altitudes. In a country with limited resources, where the nutritional level of the population has to be maintained under inhospitable conditions, potato has a special place for culture. Potato can be grown almost on any type of soil, except alkaline soil, though it is tolerant even to saline conditions. It thrives best in sandy or sandy loam soils. A cereals crop cannot be grown successfully in poor types of loose, shifting soils. But unlike cereals, potato builds up food materials underground and thrives in a loose soil which allows its root system to spread and the young developing underground tubers to grow freely. It is, thus possible to get excellent potato crops even under a river-bed system of cultivations, as at Ahemdabad in Gujarat State. On the other hand, potato is by no means allergic to heavier types of soils suitable for rice or jute cultivation. Rice-potato and jute-potato are established rotations practiced in West Bengal and some parts of Eastern Uttar Pradesh.

Potato is one of the most important food crop and fourth in total production among food crops in the world. India is the 3rd largest potato producer in the world. The production of potato in the world is approximately 311.4 million tonnes with an area under potato 19.22 million hectare. An average productivity of potato is 16.20 tonnes/hectare, while. in India, production of potato was about 24 million tonnes with an area of 1.2 million hectares arid productivity of 19.7 tonnes/hectare (Singh and Kumar, 2004).

The main potato producing states, in order of importance are Uttar Pradesh, Bihar, West Bengal, Assam, Punjab, Madhya Pradesh, Himachal Pradesh, Haryana, Maharashtra. Karnataka, Meghalaya and Tamil Nadu. In U.P., potato is cultivated in about 0.432 million hectares with the production of about 7.68 million tonnes. The productivity of potato in U.P. is 17.78 tonnes/hectare (Singh and Kumar, 2004).

Potato is one of the most important cash crop of district Jaunpur (U.P.) and has significant importance in the economy of the district. Area under potato in this district during 2001-02 was 0.117 lakh hectare while total production was 2.56 lakh metric tonnes. The productivity of potato in Jaunpur district was 21.82 tonnes /hectare but so far, not any systematic study on economics or potato production has been conducted. Keeping in view the above-mentioned facts, to study about costs and returns of potato cultivation and to work out the marketable and marketed surplus of potato.

METHODOLOGY

Multi-stage purposive cum-random sampling technique was used to selected district, block, villages and respondents. Jaunpur district of Eastern U.P. was selected purposively, because of higher concentration of area and production of potato in this district. Out of 19 blocks, one block namely, Shahganj was selected for the present study because of higher concentration of potato production in this block as compared to other blocks. A list of all villages of Shahganj block was prepared according to acreage under potato cultivation. Two nucleus villages were selected (one near city and another 20 km away from city) to farm clusters with four surrounding villages of each nucleus villages. Thus, 10 villages were selected for the present study. A list of all the potato growers of 16 selected villages were prepared and classified into marginal (below 1 ha), small (1-2 ha), medium (2-3 ha) and large (3 & above ha). Further 10 farmers from each selected villages were randomly selected in proportion to their size groups of farm selected. Total 100 respondents (44 marginal, 26 small, 18 medium and 12 large) were selected based on proportional random sampling method. The data were collected using structured interview schedule. The data collected were then analyzed using appropriate statistical tools namely, frequency, percentage, mean and standard deviation.

$$\text{Weighted mean} = \frac{\sum WXi}{\sum W}$$

Where,
W = Weight of Xi
Xi = Variable

RESULTS AND DISCUSSIONS

Cost of Cultivation of Potato

Table 1 revealed that on an average, cost of cultivation of potato per hectare was observed Rs. 32673.64 on first cluster. Average cost was found maximum on marginal farms i.e. Rs. 33108.71 followed by small farms Rs. 32958.63, medium farms Rs. 31945.93 and large farms Rs. 31552.43. Higher cost on marginal farms was mainly associated due to comparatively more expenditure on family labour. Whereas in case of second cluster, on an average, cost of cultivation were per hectare observed Rs. 31073.19. Average cost was higher on marginal farms i.e. Rs. 31920.63 followed by small farms Rs. 30904.21, medium farms Rs. 30172.73 and large

farms Rs. 29682.71. Higher cost on marginal farms was mainly due to comparatively more expenditure on family labour. The study further reveals that maximum cost was incurred on seed i.e. 42.29 per cent, followed by family labour 21.65 per cent, manure and fertilizers 8.20 per cent, irrigation charges 3.86 per cent, hired labour 3.34 per cent, tractor and machinery Charges 2.82 per cent, bullock labour 2.56 per cent and plant protection 1.71 per cent, respectively on first cluster farms.

The costs incurred on other items like interest on working capital and rental value of owned land were almost the same. The maximum share among these items was rental value of owned land being 11.63 per cent of the total cost per hectare.

Whereas in case of second cluster, it was 40.28 per cent on seed cost, followed by family labour 23.92 per cent, manure and fertilizers 8.20 per cent, irrigation charges 4.41 per cent, hired labour 3.29 per cent, tractor and machinery charges 2.86 per-cent, bullock labour 2.34 per cent and plant protection 1.53 per cent, irrespective of size of sample farms. The costs incurred on other items like interest on working capital and rental value of owned land were almost the same. The maximum share among these items was of rental value of owned land being 11.26 per cent of the total cost per hectare.

The study further reveals that overall average cost per hectare was observed Rs. 31873.42 and major components of cost was 41.32 per cent on seed cost followed by family labour 22.75 per cent, manure and fertilizers 8.20 per cent, irrigation charges 4.13 per cent, hired labour 3.31 per cent, tractor and machinery charges 2.84 per cent, bullock labour 2.45 per cent and plant protection 1.62 per cent.

The cost incurred on other items like interest on working capital and rental values of owned land were almost the same. The maximum share among these items was of rental value of owned land being 11.45 per cent of the total cost per hectare.

It can be inferred from the Table 1 that, average cost (per hectare) in second cluster was more as compared to first cluster due to employment of more family force on second cluster.

Measures of Costs and Returns of Potato

Costs and returns of potato under different size group of sample farms are presented in Table 2. The cost C1 was accounted for Rs. 35241.24, Rs. 33303.60, Rs. 30580.53 and Rs. 29282.21 on marginal, small, medium and large size of sample farms respectively with an average of Rs. 33193.44 for first cluster whereas, it was Rs. 35413.68, Rs. 31611.90, Rs. 30192.41 and Rs. 28027.87 on marginal, small, medium and large size of sample farms respectively with an average of Rs. 32599.09 for second cluster. Overall average of cost C1 was observed Rs. 32891.27 for both the clusters. The findings were in line with the research results of Keruret al. (1998)

Similarly, cost C., was worked out i.e. Rs. 39041.23, Rs. 37103.60, Rs'. 34380.53 and 33082.21 on marginal, small, medium and large size of sample farms respectively with an average of Rs. 36983.44 for first cluster, whereas, it was worked out Rs. 38913.68, Rs. 35111.90, Rs. 33692.41 and Rs. 31527.87 on marginal, small, medium and large size of sample farms respectively with an average of Rs. 36099.09 for second cluster. Overall average of cost C was observed Rs. 36541.27 for both the clusters.

Overall, cost of cultivation of potato per

hectare on cost Ai/A, was worked out Rs. 20971.18. Cost B1 Rs. 25639.04, cost B2 Rs. 29289.04, cost C1 Rs. 32891.27 and cost C, Rs. 36541.27, respectively.

It was observed that farm production of potato gross return was more on marginal farms than that of small, medium and large farms in case of both the clusters, because of more use of variable inputs by these farmers as compared to other. On an average, gross returns came to Rs. 97366.04 and Rs. 96564.52 for first and second cluster while overall gross returns came to Rs. 96965.28. Net returns over cost C1 and C2 were calculated Rs. 64182.60 and Rs. 60382.60 for first cluster and Rs. 63965.43 and Rs. 60465.43 for second cluster. Overall average came to Rs. 64074.02 and Rs. 60424.02 per hectare, respectively. The findings were in line with the research results of Singh et al.(1991) and Panditet al. (2002).

Similarly, family labour income, farm investment income and farm business income were worked out to Rs. 67455.83, Rs. 45093.25 and Rs. 75565.64, respectively in case of first cluster whereas, in case of second cluster, it was Rs. 67896.66, Rs. 44624.99 and Rs. 76422.56, respectively. The overall average was observed Rs. 67676.25, Rs. 44859.12 and Rs. 75994.10, respectively.

Cost of production per quintal of potato was computed to Rs. 176.88 in case of first cluster and Rs. 174.02 for second cluster. Overall cost of production/quintal was computed to Rs. 157.91 and Rs. 175.45, respectively. On an average, input-output ratio on the basis of cost Ai/A2, cost B1, cost B2, cost C1 and cost C2 were worked out to 4.99, 3.73, 3.26, 2.94 and 2.64, respectively for Ist cluster whereas, in case of second cluster, it was worked out 4.80, 3.84, 3.37, 2.98 and 2.69, respectively. On overall average was 4.65, 3.79, 3.32, 2.96 and 2.67, respectively.

Marketable and Marketed Surplus of Potato

The nature and extent of marketable and marketed surplus of potato per farm is presented in Table 3.

Table 3 revealed that average marketable surplus in cluster first accounted 41.43 quintals i.e. 83.92 per cent of the total production which varied from 72.22, 80.96, 81.55 and 90.61 per cent on marginal, small, medium and large farms, respectively. While in case of second cluster average marketable surplus was worked out 34.46 quintal i.e. 80.91 per cent of the total production, which varied from 72.60, 76.52, 82.23 and 85.15 per cent of total production on marginal, small, medium and large farms, respectively. Overall average of marketable surplus came to 37.95 quintals i.e. 82.53 per cent of the total production.

Average marketed surplus was worked out 40.29 quintal i.e. 81.61 per cent, which varied from 70.06, 77.92, 78.68 and 88.96 per cent of the total production on marginal, small, medium and large farms, respectively on first cluster. While in case of second cluster, average marketed surplus came to 32.83 quintal i.e. 77.08 per cent which varied from 69.62, 70.42, 78.28 and 82.09 per cent of the total production on marginal, small, medium and large farms, respectively. Overall average of marketed surplus was observed to 36.56 quintal per farm i.e. 79.51 per cent of the total production. It can be inferred from the table that marketable and marketed surplus was increasing with the increase of size of sample farms in both the clusters. The findings were in line with the research results of Dahiya&Pandey, (1992).

Table 1 per hectare cost of different inputs used on different size group of potato

(Rs.)

Items	1st cluster					II nd cluster					Overall
	Marginal	Small	Medium	Large	Average	Marginal	Small	Medium	Large	Average	
Family labour	8980.27 (27.12)	6720.87 (20.39)	5070.54 (15.87)	3848.24 (12.20)	7073.23 (21.65)	8796.73 (27.56)	7416.52 (24.00)	6113.97 (20.26)	4432.19 (14.93)	7431.23 (23.92)	7252.23 (22.75)
Hired labour	112.60 (0.34)	1062.26 (3.22)	2228.56 (6.98)	3025.27 (9.59)	1089.90 (3.34)	120.88 (0.38)	1160.15 (3.75)	1748.91 (5.80)	2940.76 (9.91)	1022.52 (3.29)	1056.21 (3.31)
Bullock power	1120.39 (3.38)	845.95 (2.57)	520.17 (1.63)	247.00 (0.78)	836.20 (2.56)	913.17 (2.86)	698.68 (2.26)	602.48 (2.00)	298.85 (1.01)	727.76 (2.34)	781.98 (2.45)
Tractor & Machineries	586.43 (1.77)	1075.64 (3.26)	1198.82 (3.75)	1390.00 (4.41)	920.28 (2.82)	657.54 (2.06)	827.23 (2.68)	1243.57 (4.12)	1334.56 (4.50)	888.40 (2.86)	904.34 (2.84)
Seed cost	13425.38 (40.55)	14105.37 (42.81)	14120.90 (44.20)	14180.28 (44.94)	13817.97 (42.29)	12899.48 (40.41)	12137.21 (39.27)	12116.33 (40.16)	12520.97 (42.18)	12514.90 (40.28)	13166.43 (41.32)
Manure & fertilizer	2682.36 (8.10)	2837.53 (8.61)	2515.33 (7.87)	2580.40 (8.18)	2680.41 (8.20)	2627.52 (8.23)	2662.17 (8.61)	2410.18 (7.99)	2218.89 (7.48)	2548.37 (8.20)	2614.39 (8.20)
Irrigation charges	1310.81 (3.96)	1312.24 (3.98)	1185.18 (3.71)	1098.17 (3.48)	1263.05 (3.86)	1448.78 (4.54)	1421.57 (4.61)	1218.35 (4.04)	1208.23 (4.07)	1371.36 (4.41)	1317.21 (4.13)
Plant protection	498.38 (1.51)	545.21 (1.65)	634.33 (1.99)	686.83 (2.17)	557.64 (1.71)	368.39 (1.15)	498.51 (1.61)	620.14 (2.06)	594.75 (62.00)	474.70 (1.53)	516.17 (1.62)
Interest on working capital	592.09 (1.79)	653.53 (1.98)	672.10 (2.10)	696.24 (2.21)	634.96 (1.94)	588.14 (1.84)	582.17 (1.88)	598.80 (1.98)	633.51 (2.13)	593.95 (1.91)	614.46 (1.93)
Rental value of owned land	3800.00 (11.48)	3800.00 (11.53)	3800.00 (11.90)	3800.00 (12.04)	3800.00 (11.63)	3500.00 (10.97)	3500.00 (11.33)	3500.00 (11.59)	3500.00 (11.79)	3500.00 (11.26)	3650.00 (11.45)
Total	33108.71	32958.63	31945.93	31552.43	32673.64	31920.63	30904.21	30172.73	29682.71	31073.19	31873.42

(Value in parentheses denote percentage)

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Table 2 Measures of per hectare costs and returns of potato

(Rs.)

S.No.	Items	Ist cluster					II"" cluster					
		Marginal	Small	Medium	Large	Average	Marginal	Small	Medium	Large	Average	Overall
1.	Cost A1/A2	20328.44	22437.76	23075.39	23904.19	21800.40	19623.90	19987.69	20558.78	21750.52	20141.96	20971.18
2.	Cost B1	262160.97	26582.73	25509.99	25433.97	26110.21	26616.95	24195.38	24078.44	23595.68	25167.86	25639.04
3.	Cost B2	30060.97	30382.73	29309.99	29233.97	29910.21	30116.95	27695.38	27578.44	27095.68	28667.86	29289.04
4.	Cost Ci	34241.24	33303.60	30580.53	29282.21	33183 44	35413.68	31611.90	30192.41	28027.87	32599.09	32891,27
5.	Cost C2	39041.24	37103.60	34380.53	33082.21'	36983.44	38913.68	35111.90	33692.41	31527.87	36099.09	36541.27
6.	Gross income	98792.00	97394.00	95996.00	94132.00	97366.04	98326.00	96928.00	94598.00	92268.00	96564.52	96965.28
7.	Net return over cost C1	63550.76	64090.40	65415.47	64849.79	64182.60	62912.32	65316.10	64405.59	64240.13	63965.43	64074.02
8.	Net return over cost C2	59750.76	60290.40	61615.47	61049.79	60382.60	59412.32	61816.10	60905.59	60740.13	60465.43	60424.02
9.	Family labour income	68731.03	67011.27	66686.01	64898 03	67455.83	68209.05	69232.62	67019,56	65172.32	67896.66	67676.25

S.No.	Family	Name of the Macrophytes	Habitat
1.	Typhaceae	Typha augustata	Emergent
2.	Potamogetonaceae	Potamogetonnatans	Floating
3.	Hydrochariataceae	Vallisnaria-spiralis, Hydrilla-verticellata	Submerged
4.	Polygonaceae	Polygonum serulatum	Emergent
5.	Trapaceae	Trapa bispinosa	Floating
6.	Pontederiaceae	Eicchornia crassipes	Floating
7.	Ceratophyllaceae	Ceratophylum demersum	Submerged
8.	Nympheaceae	Nelumbo nucifera, Nymphaea-stellata	Floating
9.	Azollaceae	Azolla pinnata	Floating
10.	Acanthaceae	Asteracantha-longifoliaa	Emergent
11.	Lentibulariaceae	Utricularia flexulosa	Submerged
12.	Cyperaceae	Cyperus-pangarei	Emergent
13.	Ipomoeeace	Ipomea aquatica	Submerged
14.	Plantaginazeae	Limnophilla-aquatica	Emergent

ISSN: 2319-880X

Particulars			IstCluster			IInd cluster					
	Marginal	Small	Medium	Large	Average	Marginal	Small	Medium	Large	Average I	Overall
Production	15.26	41.48	62.94	171.17	49.37	15.11	29.99	57.52	148.27	42.59	45.98
Family consumption	2.02	3.56	2.33	4.44	2,77	2.18	2.53	2.77	4.57	2.66	2.72
	(13.24)	(8.58)	(3.70)	(2.59)	(5.61)	(14.43)	(8.44)	(4.82)	(3.08)	(6.25)	(5.91)
Seed	1.51	2.77	6.22	8.50	3.52	1.25	2.92	5.17	14.37	3.96	3.74
	(9.89)	(6.68)	(9.88)	(4.47)	(7.13)	(8.27)	(9.74)	(8.99)	(9.69)	(9.31)	(8.13)
Wages	0.71	1.57	3.06	3.13	1.65	0.71	1.59	2.28	3.08	1.50	1.58
	(4.65)	(3.78)	(4.86)	(1.83)	(3.34)	(4.70)	(5.30)	(3.96)	(2.08)	(3.53)	(3.43)
Losses	0.33	1.26	1.81	2.82	1.14	0.45	1.83	2.27	4.53	1.63	1.39
	(2.16)	(3.04)	(2.88)	(1.65)	(2.31)	(2.98)	(6.10)	(3.95)	(3.06)	(3.83)	(3.02)
Marketable surplus	11.02	33.58	51.33	155.10	41.43	10.97	22.95	47.30	126.25	34.46	37.95
	(72.22)	(80.96)	(81.55)	_190.61)	(83.92)	(72.60)	(76.52)	(82.23)	(85.15)	(80.91)	(82.53)
Marketed surplus	10.69	32.32	49.52	152.28	40.29	10.52	21.12	45.03	121.72	32.83	36.56
	(70.06)	(77.92)	(78.68)	(88.96)	(81.61)	(69.62)	(70.42)	(78.28)	(82.09)	(77.08)	(79.51)**

(Values in parentheses denote percentage)

****Overall**

CONCLUSION

It may be concluded that Overall, cost of cultivation per hectare was observed Rs. 31873.42, the major share of cost was 41.32 per cent of seed followed by 22.75 per cent family labour and 8.20 per cent manure and fertilizer, respectively.

On an average, gross return, net return, family labour income, farm investment income and farm business income Rs. 98965.25, Rs. 60424.02, Rs. 67676.25 and Rs. 44859.12, respectively. Overall, cost of production per quintal on the basis of cost C1 and C was found Rs. 157.91 and Rs. 175.45, respectively. On an overall average, input-output ratio was found 2.67 per cent. Overall average of marketable surplus came to 37.95 quintal i.e. 82.53 per cent of the total production and overall average of marketed surplus was recorded to 36.56 quintal per farm i.e. 79.51 per cent of the total production.

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EFFECT OF PROFENOFOS (INSECTICIDE) ON HEMATOLOGICAL PARAMETERS OF OCCUPATIONALLY EXPOSED WORKERS

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Abstract

ρrofenofos (O-4-bromo-2chlorophenyl O-ethyl S-propyl phosphorothioate) are chemical substances used in agricultural production to protect crops against insects. They help to achive better quality and quantity of crops; however, they also are capable of causing occupational diseases in farmers and workers. During the spraying time we collected the blood sample of workers during month of November(2014) to January(2015) from different villages of Seoni district (M.P.). In the present study, total 26 blood samples were collected out of which 21 persons were exposed to profenofos insecticide .They were compared with 5 control persons. Different blood parameters and liver enzymatic test were determined in comparison to control subjects. The results indicate some alterations in blood indices and liver enzymatic test in all the exposed workers. Low MCV, MCH, PCV was noted in almost all the exposed worker. High lymphocyte, eosinophill, neutrophill, MCV, MCH was noted in some workers. Only two workers found with high liver bilirubin and SGPT . Survey of exposure indicated that prolonged profenofos exposure affected the health of Workers and produced dermatological, respiratory and other clinical disorders.

Key Words: Profenofos, Blood Parameters, Human Health.

Pages: 07 **References: 12**

INTRODUCTION

Profenofos is a natural toxic organophosphorous insecticide which kill insects in field (Ismail *et. al.,* 2010). The use of organophosphorous insecticides has increased food production with increasing population in many parts of the world. (Al-Shinnawy, 2008). Exposure to profenofos in the recent years has increased manifold due to their intense application and as such the risk of occupational hazards have also multiplied tremendously. According to WHO (2009), approximately 25 million profenofos poisoning cases occur annually among agricultural workers in developing countries.

There is doubt that some persistent insecticide accumulate in various biological system at level much higher than those in their surroundings. There are 3 major routes of transport of this insecticide within the body that may be through leaching water, aerial contamination and accidental or professional exposure. Agricultural workers are exposed to profenofos primarily through mixing of chemicals, loading into dispensers, application, clean up and disposal of empty chemical containers (Wolf *et. al.,* 1967).

Profenofos affects the blood parameters of occupationally exposed workers. Correlation of different blood parameters with the harmful effects of profenofos especially in the case of total leukocytes count (TLC), red cell count (RBC), WBC, hemoglobin content (Hb%), hematocrit/ packed cell volume (PCV), differential leukocyte counts (DLC), MCV, MCH, MCHC and platelet count has been reported by many researches (Srivastava *et. al.,* 1991, Mythilal, 2000, Lee *et. al.,* 2002, Corsini *et. al.,* 2005). Much work has been done in many countries on profenofos blood parameter correlation. Profenofos is largely known to causes different symptoms in liver and kidney. Profenofos causes different symptoms of toxicity and biochemical changes in the enzyme activity of the liver like- SGOT (Serum Glutamic Oxaloacetate Transaminase) , SGPT (Serum Glutamic Pyruvate Transaminase) (Reitmann et.al.,1957). Profenofos are also affect liver Bilirubin , Biliviridin as well as Acid and Alkaline phosphateses level.

Most occupational exposures to this insecticide occur from skin absorption and inhalation as the sprayers are from poor family and not in a habit to use face masks. Farm workers, traders and people employed in the manufacture of pesticides are especially at risk of pesticides exposure. Such risks are particularly pronounced in developing nations, where hazards are commonly less well understood healthwise and safety regulations are less stringent or poorly enforced. Accidental oral contamination can occur when farmers eat, drink or smoke while spraying or do so shortly after spraying without washing their hands.

MATERIAL AND METHODS

Total 26 Blood samples taken during spraying time from November(2014), to January(2015). Out of which 21 persons were exposed to profenofos and 5 normal control persons(not exposed to profenofos) taken for the determination of profenofos residues and different blood parameters and liver enzymatic parameters.

The subjects were selected from Seoni District. Profenofos sprayers were selected from agricultural workers/farmers in different age groups. Agricultural workers and traders exposed to profenofos were interviewed and their details with regard to age, smoking habit, sex and duration of exposure were reported complete questionnaire in which personal data, working activity, type and duration of contact with profenofos, smoking habits, precautions taken during exposure to profenofos, and any physiological problem after exposure were recorded.

The following hematological parameters were studied to correlate any possible relation with the other studied parameters- R.B.C.count, W.B.C count, MCV,MCH,MCHC, differential leukocyte count(DLC), Hemoglobin percentage, hematocrit value/PCV. Enzymatic test

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like- SGOT(Serum Glutamic Oxaloacetate Transaminase), SGPT(Serum Glutamic Pyruvate Transaminase), Billirubin and Acid and Alkaline phosphateses level. These blood parameters were studied using standard hematological procedures.

RESULTS AND DISCUSSION

The present work showed that the blood samples of 21 exposed sprayers, 8 peoples were found affected. These people showed low level of MCV, MCH, neutrophill and eosinophill, out of which 4 persons were prolonged smoker. Other 4 persons showed high level of MCHC, neutrophill, eosinophil. Only 2-3 persons were found with low level of lymophocyte and htc/pcv . 1-2 persons found with high level of Hct and lymphocyte. as well as 2 persons were reported with high level of liver bilirubin and SGPT.

Table-1(a): Determination of blood parameters in the Profenofos exposed workers/traders-

Sample no.	Blood Parameters												
	Hb	TLC	N	E	B	L	M	HCT	RBC	MCV	MCHC	MCH	PLT
1	12.6	5.9	60	04	00	34	02	37.3	4.98	75.1*	33.7	25.3*	167
2	14.1	8.8	46*	07*	00	45*	02	39.0	5.80*	67.4*	36.1*	24.3*	229
3	12.4	7.8	54	07*	00	36	03	35.2*	5.15	68.5*	35.2	24.0*	137
4	13.5	7.2	60	05	00	33	02	39.0	4.74	82.4	34.6	28.4	155
5	12.1	6.3	60	05	00	33	02	34.4*	4.80	71.7*	35.1	25.2*	170
6	12.4	6.4	69	04	00	25	02	36.2	5.4	67.2*	34.2	22.9*	118
7	14.8	5.7	56	05	00	37	02	40.3	4.25	94.9	36.7*	4.8*	169
8	13.4	7.6	67	05	00	26	02	37.2	4.11	72.9*	36.0	26.2	131
9	12.0	9.4	60	07*	00	30	03	34.0*	4.64	73.4*	35.2	25.8*	185
10	12.8	6.5	44	05	00	49*	02	36.1	4.25	85.1	35.4	30.1	112
11	13.7	8.4	74	04	00	20	02	39.5	5.68*	69.7*	34.6	24.1*	128
12	13.7	5.5	52	07*	00	38	03	39.2	4.57	85.9	34.9	29.9	134
13	12.0	9.6	82*	02	00	15*	01*	36.8	5.14	71.6*	32.6	23.3*	207
14	14.7	8.8	63	05	00	30	02	42.3	4.98	85.1	34.7	29.5	151
15	13.7	8.9	57	07*	00	34	02	37.6	5.75*	65.4*	36.4	28.3*	150
16	13.2	9.7	77*	07*	00	14.1*	02	35.8*	4.5	79.5*	36.8*	29.2	345
17	12.1	6.4	63	05	00	34	04	34.7*	4.70	72.3*	35.1	25.4	181
18	12.1	6.3	55	05	00	38	02	38.8	3.94	98.5	38.9*	38.3*	198
19	15.4	6.6	62	03	00	33	02	39.4	4.69	84.2	39.0*	32.8*	173
20	13.4	7.6	63	07*	00	18*	02	38.2	4.62	99.3*	31.5	36.5*	185
21	15.9	6.3	64	05	00	29	02	42.0	4.46	94.2	37.8*	35.6*	231

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Table 1(b):

Sample No.	Liver enzymatic parameters			
	SGOT	SGPT	Bilirubin	Alkaline phosphate
1	35.07	40.06*	1.44*	110.02
2	29.42	31.07	0.94	89.74
3	28.06	30.05	0.72	90.42
4	20.06	24.00	0.36	80.14
5	20.06	34.08	1.08*	95.17
6	18.06	24.08	0.72	92.10
8	31.09	27.49	0.79	118.04
9	22.90	14.92	1.44*	84.70
10	19.85	25.02	0.28	150.03
11	30.49	37.05*	2.52*	85.43
12	17.08	21.30	0.41	227.01
13	37.02*	16.10	0.91	113.71
14	12.70	26.03	0.80	215.68
15	13.90	15.06	0.69	116.17
16	19.42	20.23	0.51	91.06
17	19.33	18.84	0.61	69.07
18	14.87	20.91	0.48	79.09
19	34.01	30.02	0.92	123.22
20	27.05	31.89	0.86	132.04
21	26.02	17.05	0.93	149.03

Note- In this tables the affected blood parameters were showed by '*'

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In the control group only 2 person were found . out of which one affected from low level of MCV and second affected from the low level of MCH. They are not affected regarding other parameters.

Table 2(a): Determination of the blood parameters in the blood of normal (control) workers-

Sample no.	Blood Parameters												
	Hb	TLC	N	E	B	L	M	Hct	RBC	MCV	MCHC	MCH	PLT
1	13.4	6.6	69	5	0	33	2	39.1	4.26	84.3	33.7	25.2*	197
2	12.6	7.1	52	5	0	28	2	37.3	3.80	91.1	32.8	29.5	196
3	12.8	5.6	57	6	0	27	4	46.4	5.21	97.5	34.1	29.1	191
4	14.2	4.9	61	4	0	31	2	40.3	4.90	78.4*	35.2	27.2	163
5	13.7	6.3	64	3	0	30	3	45.5	3.75	86.3	33.6	30.3	159

Table 2(b):

Sample No.	Liver enzymatic parameters			
	SGOT	SGPT	Bilirubin	Alkaline phosphate
1	31.80	24.50	0.56	116.10
2	19.42	16.20	0.89	122.15
3	27.05	30.01	0.77	99.08
4	35.40	17.05	0.71	91.03
5	14.83	19.04	0.69	113.60

Normal values: Hb = hemoglobin [11.0-16.0 g/dl], TLC=total leucocyte count[4000-5000/cumm], N=Neutrophill[50-75%], E=Eosinophill[1-5%], B= Basophill[0-1%], L=Lymphocyte[20-40], M=Monocyte[2-5%], Hct=Hematocrit[36-48%], RBC = Red blood cell count[3.5-5.5mil/cmm] , MCV=Mean corpuscular volume[80-99fl], MCHC=Mean corpuscular hemoglobin concentration[32-36gm/dl], MCH= Mean corpuscular hemoglobin[26-32pg], PLT=Platelet count[100-400 Thsd /cmm].

Azmi *et.al.*, (2009), reported some alterations in blood indices in all the insecticide exposed persons, and only two persons from two different stations were affected severely and therefore their Hb, MCV, MCHC, TLC, monocyte and neutrophil counts increased significantly . High lymphocyte count was noted in almost all the exposed persons. Platelets count was also found high in few persons but Hb, MCV, MCH, TLC, RBC and neutrophil counts significantly decreased in such persons. Exposure of multiple pesticides for prolonged period has also affected the health of exposed persons and produced dermatological, hepatic, nephritic, respiratory and other clinical disorders reflecting the toxic effects of pesticides.

Lu *et.al.*, (2007), reported abnormal eosinophil cout in insecticide sprayers. Increment of blood eosinophill level was observed in subjects that suffering from cough, wheezing , eye and nasal irritation and other allergic symptoms like itching, sneezing, skin rashes and breathlessness. **Kossmann *et.al.*, (1993),** observed high lymphocyte count in almost all the exposed persons from different farm stations. Platelet count was found low in almost all the exposed cases. Only few persons showed high platelet counts in some stations due to the frequent and direct exposure of profenofos insecticides during their working time but their Hb, Hct, MCV, MCH, RBC and neutrophil counts were found in low levels in such persons .

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DIVERSITY OF MACROPHYTE COMMUNITY OF A LENTIC WATER BODY OF JABALPUR

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Abstract

The study was conducted to observe the diversity of macroptyte community of Robertson Lake of Jabalpur. The macrophyte community comprised of 16 species belonging to 14 families & showed seasonal fluctuation.

Key words :- Diversity, Macrophytes, Aquatic Macroscopic Plants.

Pages: 3 **References: 8**

INTRODUCTION

Macrophytes, the aquatic macroscopic plants also known as hydrophytes. Confine themselves to the littoral zone of the lake & contribute significantly to the total primary production.

The hydrophytes exhibit poor mechanical, conductive absorbing & protective tissues & possess air spaces in the tissues. They play an important role in the productivity & nutrient status. They provide an enormously large surface area for the growth of microflora & fauna and help in anchoring the fish spawn but sometimes they hinder the growth of aquatic animals, particularly fishes. They utiize mineral elements from the bottom sediments and hereby affecting nutrient level of aquatic ecosystem (Deka *et. al.,* 2012).

Studies on different aspects of macrophytes of fresh water ecosystem were carried by Odum (1959), Mishra & Tripathi (2004), Sobha & Harilal (2005), Mathur & Mathur (2006) & Kiran *et. al.,* (2007).

The importance of macrophytic studies in fresh water ecosystem was recognized quite late as compared to the studies on physico chemical and phytoplanktonic parameters.

STUDY AREA

Robertson lake is one of the largest lake

left behind by Gondwana Regime. The lake spreads over the area of 67 hectare being situated in a remote suburban area of the city. This lake is in a better condition as compared to most of the other ponds in the city, which have fallen prey to the greed of land Mafia or are being swallowed by the slums erupting like cancerous sores on the bank of the pond.

MATERIAL AND METHOD

For the present study five sites were chosen (i.e. East, West, North, South & Central). The macrophytic species were collected & identified with the help of Burche (1991) & Cook (1996).

RESULT & DISCUSSION

The list of macrophytes of the Robertson lake is presented in Table No. 1.

S.No.	Family	Name of the Macrophytes	Habitat
1.	Typhaceae	Typha augustata	Emergent
2.	Potamogetonaceae	Potamogetonnatans	Floating
3.	Hydrochariataceae	Vallisnaria-spiralis, Hydrilla-verticellata	Submerged
4.	Polygonaceae	Polygonum serulatum	Emergent
5.	Trapaceae	Trapa bispinosa	Floating
6.	Pontederiaceae	Eicchornia crassipes	Floating
7.	Ceratophyllaceae	Ceratophylum demersum	Submerged
8.	Nympheaceae	Nelumbo nucifera, Nymphaea-stellata	Floating
9.	Azollaceae	Azolla pinnata	Floating
10.	Acanthaceae	Asteracantha-longifoliaa	Emergent
11.	Lentibulariaceae	Utricularia flexulosa	Submerged
12.	Cyperaceae	Cyperus-pangarei	Emergent
13.	Ipomoeeace	Ipomea aquatica	Submerged
14.	Plantaginazeae	Limnophilla-aquatica	Emergent

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The macrophytic communities comprises of a 14 families, represented by 16 species.

Out of families 5 sps were emergent 7 sps floating 5 sps. were from submerged habitat.

During the present study, free floating herb Eicchernia crassipes was observed as most dominant macrophyte, on the banks & towards the inlets.

Other major macrophytes observed during studies were water spinach (Ipomoea aquatic) & Nelumbo nucifera.

Most of the macrophytic communities were perennial but their occurrence was found decreaseed in rainy season & found evident during post monsoon periods.

This study reveals that the large part of the lake is covered by macrophytes. In shallow areas the spreading of macrophyte reduces areas available to the aquatic animals & obstruct their mobility.

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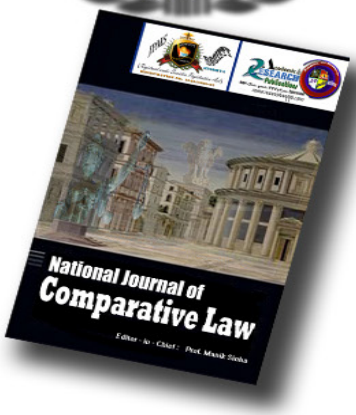

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